

## Factors associated with ever HIV testing among injecting drug users (IDUs) in two HIV high prevalent States of India

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**Background & objectives:** Injecting drug use plays a major role in HIV transmission in northeastern States of India. HIV testing is the fundamental component of HIV prevention, treatment and care; but it remains relatively low among injecting drug users (IDUs) in the northeast region of the country. We assessed the factors associated HIV testing among IDUs in the two northeastern States (Nagaland & Manipur) of India.

**Methods:** A total of 1699 IDUs from four districts of Manipur (Churachandpur and Bishenpur) and Nagaland (Phek and Wokha) were recruited through respondent driven sampling (RDS). Multivariate logistic regression analysis was performed to determine the factors associated with ever HIV testing.

**Results:** Only 286 (16.8%) respondents were ever tested for HIV. Factors associated with ever HIV testing were: having 5-10 years of education (AOR: 2.41, 95% CI: 1.15-5.06), having >11 years of education (AOR: 3.96, 95% CI: 1.83-8.57), being a businessman (AOR: 1.79, 95% CI: 1.14-2.85), having been contacted by HIV programme workers (AOR: 1.92, 95% CI: 1.37-2.68), having received counselling services (AOR: 2.02, 95% CI: 1.45-2.81), having knowledge that HIV can be prevented (AOR: 4.33, 95% CI: 2.05-9.12), having self-perceived risk of HIV infection (AOR: 1.68, 95% CI: 1.26-2.24) and being a resident of Churachandpur district (AOR: 2.26, 95% CI: 1.36-3.75).

**Interpretation & conclusions:** Increased uptake of HIV testing was associated with exposure to HIV programmes, knowledge of HIV prevention, self-perceived risk of HIV, and higher educational attainment. Urgent measures need to be undertaken based on these findings to promote uptake of HIV testing among the IDUs in this region.

**Key words** HIV - HIV positives - HIV testing - injecting drug users

Illicit injecting drug use is closely associated with HIV epidemic in northeastern States of India. Two States of northeast India viz. Manipur and Nagaland are among the six high HIV prevalence States in India<sup>1</sup>.

There are evidences that injecting drug use has played a critical role in transmitting the HIV to the general population in these States<sup>2-4</sup>. According to the National AIDS Control Organization (NACO), there were about

24000-26800 injecting drug users (IDUs) in Manipur and 15500-16800 in Nagaland in 2006<sup>1</sup>. Although with HIV prevention interventions, the HIV seropositivity among IDUs has been declining over the years, but continues to be high in some districts<sup>1</sup>. According to the sentinel surveillance report, the overall prevalence of HIV among IDUs in Manipur was 20 per cent<sup>1</sup>.

The voluntary HIV counselling and testing (VCT) is considered as a cost-effective strategy for combating spread of HIV infection<sup>5</sup>. The knowledge of HIV infection substantially reduces the high risk behaviours among HIV positive persons<sup>6-8</sup>. HIV infected persons who are unaware of their infection may be the major source of transmission of HIV to others. Studies have shown that HIV infected persons who are unaware of their HIV infections account for more than half of the new HIV infections in USA<sup>9</sup>. Further, with the advent of highly active anti-retroviral therapy (HAART) for HIV infection, the HIV testing provides an opportunity to HIV infected persons for early diagnosis and access to HAART.

The findings of the Integrated Biological and Behavioural Assessment (IBBA) study among IDUs<sup>10</sup> suggest that IDUs may continue to be critical subpopulation of HIV transmission in this region as large proportion of IDUs continues to exhibit high risk injecting and sexual behaviours<sup>10</sup>. However, despite the importance of HIV testing for HIV prevention, treatment and care, HIV testing among IDUs remains extremely low<sup>10</sup>. According to IBBA report life time uptake of HIV testing among IDUs in these two States was only about 6 to 26 per cent<sup>10</sup>. The untested HIV positive IDUs who are unaware of their HIV status may continue to spread HIV virus to others through their high risk behaviours and at the same time they may also miss the opportunity to be enrolled for anti-retroviral therapy.

IDUs in this region represent a socio-economically diverse population groups<sup>10</sup>. Hence, it is important to identify those socio-demographic sections of IDUs who need greater attention from intervention programmes for promoting uptake of HIV testing than others. There is also a need to examine the impact of HIV prevention programmes and knowledge of HIV prevention on the uptake of HIV testing, so that inputs for strengthening HIV testing programme can be provided. So far, no studies have been conducted among IDUs in the region to explore such relationships. The objective of the present study was to describe the

factors associated with ever HIV testing among IDUs in Nagaland and Manipur with particular reference to socio-demographic variables, variables related to exposure to HIV intervention and knowledge about HIV prevention.

### Material & Methods

The IBBA study was carried in 2006 among IDUs in two districts each of Manipur and Nagaland. The four selected districts were Churachandpur and Bishnupur in Manipur; and Phek and Wokha in Nagaland. The districts were selected considering the diverse socio-cultural backgrounds and size of the IDU population from among the districts where *Avahan* intervention was on going. A male, aged >18 yr, having injected drugs for non-medical purposes at least once in the past six months was defined as an IDU in this study. The main objective of IBBA study was to evaluate the outcome of *Avahan* intervention programmes for male IDUs in Manipur and Nagaland, so only male IDUs were included as the survey population in the study.

Methodological details including sampling procedures adopted in the study have been described elsewhere<sup>10-12</sup>. Owing to hidden nature of IDUs in the region, respondent driven sampling (RDS) was employed to recruit the participants into the study. RDS is a modified form of chain-referral sampling, where subsequent respondents are recruited by previous respondents through their network of acquaintances<sup>13</sup>. Important methodological considerations for implementing RDS included 'seed' (initial recruits) selection, duration of field work, coupon management and tuning, amount of incentives, and the numbers of locations of RDS centres<sup>12</sup>. The sampling began with a handful of seeds from the target population who met the study eligibility criteria<sup>12</sup>. The numbers of seeds selected ranged from 6 in Churachandpur district to 9 in Wokha district. Each seed was then given three uniquely coded coupons to refer three eligible IDU peers from his own personal network for recruitment into the study. These recruits, in turn, recruited other peers for the next waves. This peer-to-peer recruitment process continued until the pre-calculated target sample size was achieved. In this study, a sample size of 400 was estimated for each survey district<sup>12</sup>. Participants were referred to a pre-fixed location (called RDS centre) with the recruitment coupon. In each districts, 1-2 such RDS centres were set up for interviewing the participants and collecting biological samples. The recruitment coupons contained basic information such

as eligibility criteria of participants, address and timing of RDS centre, and date of expiry of RDS coupon. All the participants were offered dual incentives: a primary incentive (₹ 70/-) for participating in the study and a secondary incentive (₹ 30/-) for recruiting an eligible peer into the study<sup>12</sup>.

The study was approved by the Health Ministry Screening Committee of the Government of India and ethical review bodies of the participating institutions (Family Health International, New Delhi; Regional Medical Research Center, Dibrugarh, Assam; and National AIDS Research Institute, Pune).

*Description of variables:* Data were collected from the participants after obtaining written informed consent using a pre-tested questionnaire by trained research staffs. The dependent variable of the study was ever HIV testing. The participants were asked if they had ever undergone HIV testing. The responses were categorized into ‘yes’ and ‘no’. The independent variables included socio-demographic characteristics (e.g. age, marital status, occupational status and educational status), variables related to HIV intervention programmes (e.g. registration with HIV intervention programmes, contact with non-governmental organization (NGO)/programme workers and receiving counselling services from intervention programmes in the last six months), and variables related to knowledge of HIV prevention and self-perceived risk of being infected with HIV. To gather information about exposure to HIV intervention programmes, respondents were asked to report if they had been registered with any intervention programmes (yes or no), had been contacted by NGO/programme worker (yes or no) and had received counselling services from NGO/programme (yes or no) in the last six months. To assess the self-perceived risk, respondents were asked-“Do you feel that you are at risk for becoming infected with HIV/AIDS? (yes or no)”. Similarly, to assess the knowledge about HIV prevention, participants were asked-“Are there things a person can do to prevent getting infected with HIV/AIDS? (yes or no)”.

*Statistical analysis:* Multivariate logistic regression analysis was performed to produce odds ratios and 95% confidence interval to examine associations between HIV testing (*i.e.* dependent variables) and the explanatory variables (socio-demographic variables, *i.e.* age, sex, marital status, occupation, education; variables related to HIV intervention programmes *i.e.* registered with NGOs/programmes, approached by

programme workers, receiving counselling services; and variables related to knowledge about HIV prevention and self-perceived risk of HIV infection) using SPSS software (South Asia Pvt Ltd version 17.0 Software Packages, Bangalore, India). Explanatory variables found to be significantly associated with HIV testing at 5 per cent level in the univariate analysis were included in the multivariate model. Additionally, multivariate model was controlled for the sites of the study. Results are presented for overall samples as site-specific associations were observed to be generally similar. A sensitivity test was conducted for the unweighted data and compared to the results from the weighted data as described elsewhere<sup>14,15</sup>. The individualized weights generated for the dependent variable (*i.e.* ever HIV testing) using RDS Analysis Tool version 5.6 (Heckathorn and Volz, 2006, USA) were applied to the logistic regression analysis in SPSS software to account for the biases of RDS sampling process<sup>16</sup>. However, the associations were not altered in the weighted analyses, so the unweighted results are presented as these are more conservative than the weighted results<sup>14</sup>.

## Results

A total of 1699 participants were included from the four districts with mean age of 26±5.6 yr. The majority (n=1216) of the participants were never married (71.6%), about 8 per cent (n=133) were illiterate and 60 per cent (n=1020) were unemployed or students (Table I).

Apart from Churachandpur district, less than 20 per cent of IDUs in other three districts were registered with any NGOs/programmes associated with HIV intervention. About a quarter of IDUs in Nagaland and about 50 per cent of IDUs in Manipur reported having been approached by a NGO/programme worker within the last six months. About 10-42 per cent of IDUs reported receiving counselling services from NGOs/programmes. Highest proportion of IDUs in Churachandpur district (49.6%) and lowest proportion in Wokha district (20.7%) perceived themselves to be at risk of contracting HIV infection. Majority of IDUs (60.4-96.4%) reported knowing the means to prevent getting infected with HIV (Table I).

Of the 1699 IDUs in all the four districts, 286 (16.8%) had ever undergone a HIV testing. District stratified analyses indicated that 126 (30.1%) in Churachandpur, 89 (21.2%) in Bishenpur, 41 (9.8%) in Wokha and 30 (6.8%) IDUs in Phek district had

**Table I.** Characteristics of sampled injecting drug users in each district

Variables	Districts				Overall n (%)
	Bishnupur n (%)	Churachandpur n (%)	Wokha n (%)	Phek n (%)	
<b>Age (yr)</b>					
<20	26 (6.2)	22 (5.3)	38 (9.0)	102 (23.2)	188 (11.1)
20-24	158 (37.6)	116 (27.6)	154 (36.7)	202 (45.9)	630 (37.1)
25-29	86 (20.5)	155 (37.0)	135 (32.1)	92 (20.9)	468 (27.5)
≥30+	150 (35.7)	126 (30.1)	93 (22.1)	44 (10.0)	413 (24.3)
Mean ±SD	27±6.43	27±5.18	25±4.92	22±4.58	26±5.9
<b>Marital status</b>					
Never married	283 (67.4)	270 (64.4)	293 (69.8)	370 (84.1)	1216 (71.6)
Currently married	119 (28.3)	101 (24.1)	116 (27.6)	63 (14.3)	399 (23.5)
Separated/Widower	18 (4.3)	48 (11.5)	11 (2.6)	7 (1.6)	84 (4.9)
<b>Occupation</b>					
Unemployed/ Students	218 (51.9)	193 (46.1)	292 (69.5)	318 (72.3)	1021 (60.1)
Laborer/manual class	88 (21.0)	170 (40.6)	78 (18.6)	62 (14.1)	398 (23.4)
Salaried class	37 (8.8)	17 (4.0)	38 (9.0)	24 (5.4)	116 (6.8)
Business/Self employed	77 (18.3)	39 (9.3)	12 (2.9)	36 (8.2)	164 (9.7)
<b>Educational status</b>					
Illiterate	17 (4.0%)	26 (6.2)	68 (16.2)	22 (5.0)	133 (7.8)
<5 yr	19 (4.5%)	20 (4.8)	9 (2.1)	19 (4.3)	67 (3.9)
5-10 yr	227 (54.0%)	268 (64.0)	263 (62.6)	262 (59.5)	1020 (60.0)
≥11+ yr	157 (37.4%)	105 (25.0)	80 (19.0)	137 (31.2)	479 (28.2)
<b>Registered with intervention programme</b>					
No	354 (84.3)	118 (28.2)	340 (81.0)	381 (86.6)	1193 (70.2)
Yes	66 (15.7)	301 (71.8)	80 (19.0)	59 (13.4)	506 (29.8)
<b>Contacted by programme workers</b>					
No	195 (46.4)	214 (51.1)	309 (73.6)	309 (70.2)	1027 (60.4)
Yes	225 (53.6)	205 (48.9)	111 (26.4)	131 (29.8)	672 (39.6)
<b>Received counseling services</b>					
No	245 (58.3)	263 (62.8)	370 (88.1%)	395 (89.8)	1273 (74.9)
Yes	175 (41.7)	156 (37.2)	50 (11.9%)	45 (10.2)	426 (25.1)
<b>Prevent getting infected with HIV</b>					
No	40 (9.5)	15 (3.6)	119 (28.3)	174 (39.5)	348 (20.5)
Yes	380 (90.5)	404 (96.4)	301 (71.7)	266 (60.4)	1351 (79.5)
<b>Self-perceived risk of HIV infection</b>					
No	243 (57.9)	211 (50.4)	333 (79.3)	316 (71.8)	1103 (64.9)
Yes	177 (42.1)	208 (49.6)	87 (20.7)	124 (28.2)	596 (35.1)
<b>Ever taken HIV test</b>					
No	331 (78.8)	293 (69.9)	379 (90.2)	409 (93.0)	1412 (83.1)
Yes	89 (21.2)	126 (30.1)	41 (9.8)	30 (6.8)	286 (16.8)
Total numbers	420	419	420	440	1699

**Table II.** Factors associated with ever HIV testing in univariate & multivariate logistic regression analysis

Variables	OR (95% CI)	AOR (95% CI)
<b>Age (yr)</b>		
<20	Reference	Reference
20-24	2.40 (1.22-4.75)*	1.13 (0.55-2.31)
25-29	4.07 (2.07-8.03)**	1.41 (0.68-2.94)
≥30	6.79 (3.46-13.29)**	1.98 (0.93-4.22)
<b>Marital status</b>		
Never married	Reference	Reference
Currently married	1.82 (1.37-2.43)**	1.12 (0.78-1.60)
Separated/widower	3.12 (1.92-5.05)**	1.34 (0.75-2.37)
<b>Occupation</b>		
Unemployed/ Students	Reference	Reference
Laborer/manual class	1.64 (1.21-2.22)**	1.38 (0.96-2.00)
Salaried class	1.75 (1.09-2.83)*	1.11 (0.63-1.92)
Business/self-employed	2.05 (1.33-3.15)**	1.79 (1.14-2.85)*
<b>Educational status</b>		
Illiterate	Reference	Reference
< 5 yr	1.35 (0.46-3.98)	1.09 (0.35-3.45)
5-10 yr	2.57 (1.27-5.15)**	2.41 (1.15-5.06)*
≥11 yr	4.15 (2.04-8.44)**	3.96 (1.83-8.57)**
<b>Registered with intervention programme</b>		
No	Reference	Reference
Yes	3.16 (2.43-4.09)**	1.24 (0.87-1.80)
<b>Contacted by programme workers</b>		
No	Reference	Reference
Yes	3.68 (2.81-4.81)**	1.92 (1.37-2.68)**
<b>Received counselling services</b>		
No	Reference	Reference
Yes	4.62 (3.54-6.04)**	2.02 (1.45-2.81)**
<b>Prevent getting infected with HIV</b>		
No	Reference	Reference
Yes	11.02 (5.40-22.49)**	4.33 (2.05-9.12)**
<b>Self-perceived risk of HIV infection</b>		
No	Reference	Reference
Yes	2.74 (2.12-3.55)**	1.68 (1.26-2.24)**
<b>Districts</b>		
Phek	Reference	Reference
Wokha	1.47 (0.90-2.41)	1.50 (0.88-2.55)
Bishnupur	3.67 (2.36-5.68)**	1.41 (0.86-2.31)
Churachandpur	5.86 (3.83-8.97)**	2.26 (1.36-3.75)**
<i>P</i> *<0.05, **<0.01. OR, odds ratio; AOR, adjusted odds ratio		

undergone a HIV test in their life time. In total, 284 IDUs tested positive for HIV. RDS adjusted HIV seroprevalence was higher in Manipur (Bishenpur-23.1%, Churachandpur-32.2%) compared with Nagaland (Phek-1.1%, Wokha-1.8%). Of the total 284 HIV positive IDUs, 110 (38.7%) had ever undergone HIV testing. Similarly, among 1414 HIV negative IDUs, only 176 (12.4%) had ever tested for HIV.

All the variables tested in univariate analyses emerged as statistically significant. The probability of undergoing HIV testing increased with increasing age and increasing years of education. Other factors associated with having been tested for HIV in univariate analysis were being currently married, being separated/widower, being a manual worker, being a salaried class person, being a businessman, having been registered with intervention programmes, having been approached by NGO/programme workers, having received counselling services from intervention programmes in the last six months, having self-perceived risk of contracting HIV infection, having knowledge that HIV can be prevented. In addition, being a resident of Bishenpur and Churachandpur districts was also associated with having been tested.

Multivariate analyses were performed with adjustment for all the variables tested in univariate analyses, as all the variables in the univariate analysis emerged as statistically significant. In the multivariate analysis, factors found to be significantly associated with ever having a HIV test were as follows: having 5-10 yr of education (AOR: 2.41 95% CI: 1.15-5.06), having >11 yr of education (AOR: 3.96, 95% CI: 1.83-8.57), being a businessman (AOR: 1.79, 95% CI: 1.14-2.85), having been approached by NGO/programme workers in the last six months (AOR: 1.92, 95% CI: 1.37-2.68), having received counselling services in the last six months from intervention programme (AOR: 2.02, 95% CI: 1.45-2.81), self-perceived risk of HIV infection (AOR: 1.68, 95% CI: 1.26-2.24), having knowledge that HIV can be prevented (AOR: 4.33, 95% CI: 2.05-9.12) and being a resident of Churachandpur district (AOR: 2.26, 95% CI: 1.36-3.75) (Table II). Factors significantly associated with ever having been tested for HIV remained fairly constant across all the districts in site-specific multivariate analysis (results not shown).

### Discussion

The findings of the study revealed that less than one-fifth of IDUs in Manipur and Nagaland had ever undergone a HIV test, which was lower compared to

reports from other countries<sup>17-19</sup>. Some improvement in HIV testing rate has been recorded in Manipur, but it still remained unchanged in district Wokha in Nagaland<sup>20</sup>. Our study showed that only about 39 per cent of HIV positive IDUs had ever undergone a HIV test. This is a cause of concern because the untested HIV positive IDUs who are unaware of their HIV status may transmit the infections to un-infected persons through their risky behaviours. The overall lower utilization of HIV testing services among IDUs could be due to lower coverage of voluntary counselling and testing services and lack of awareness. Other barriers of lower HIV testing among IDUs could be fear of being labelled as HIV positive, social isolation due to HIV status, lack of confidentiality in HIV testing and volatile social situation in this part of the country. Earlier qualitative study in Manipur showed that in many occasions the names of the HIV positive persons were divulged; and HIV positive persons were denied treatment from hospitals<sup>21</sup>. The relatively lower rate of HIV testing among IDUs in Nagaland could be due to their lower self-perceived risk for contracting HIV infection because of low prevalence of HIV infection among IDUs in the State compared to Manipur<sup>1</sup>. Besides, the more difficult geographical terrain of Nagaland may also likely to pose difficulties to IDUs from remote areas to utilize the services of HIV testing facilities.

Educational status was found to be an important factor associated with HIV testing among IDUs in this study. The probability of undergoing HIV testing increased with increasing educational level in multivariate analyses. Those who had more than 11 years of education were 4 times more likely to have been tested for HIV compared with illiterates in the multivariate analysis indicating strong association between educational status and HIV testing. This suggests that prevention programmes should pay greater attention to illiterates and less educated IDUs to promote uptake of HIV testing. In this study, those who were in business related occupations were significantly more likely to have been tested for HIV, which may reflect their greater HIV-related risk taking behaviours<sup>22</sup>. Among the occupational groups, unemployed or students were least likely to have been tested for HIV. This group which comprises the majority of the IDUs (>60%) need to be targeted for making the HIV testing programme successful. Although not statistically significant in the multivariate analysis, the uptake of HIV testing showed an increasing trend with increasing age. Increasing uptake of HIV testing with age may be explained by the awareness of a high

accumulation of risk for infection with age, by a higher number of life time opportunities for HIV testing<sup>17</sup>.

This study suggested importance of intervention programmes in enhancing the uptake of HIV testing. Similar to our finding, Tobin *et al*<sup>18</sup> also showed positive relationship between uptake of HIV testing and having interaction with HIV intervention outreach workers, suggesting need for continued investment in such types of programmes. Robert *et al*<sup>19</sup> showed that users of harm reduction programme were more likely to have been tested ever. In this study, only 26 to 54 per cent of IDUs reported having been contacted by the programme (outreach) workers. Apart from Churachandpur district of Manipur, not even a quarter of IDUs were registered with any intervention programmes delivering harm reduction programme suggesting the need for scaling up the programmes for promoting HIV testing.

Risk perception or a sense of vulnerability is assumed to be a motivation for self-protective behaviours which may include HIV testing and returning for the results<sup>23,24</sup>. In this study, those who perceived themselves to be at risk of HIV were more likely to have ever been tested for HIV. Such association has also been reported earlier<sup>24</sup>. However, a large majority of IDUs in this study did not perceive themselves to be at risk of HIV infection. Raising the level of perceived risk and awareness of risk behaviour and its relationship to HIV infection should be a strategy to promote HIV testing<sup>24</sup>. In our study, having knowledge that HIV can be prevented was found to be strongly associated with HIV testing, as also reported elsewhere<sup>17</sup>. Those who were unaware that HIV could be prevented were less likely to have ever been tested for HIV underscoring the need for strengthening HIV education programme. In our study, a considerable proportion of IDUs particularly in Nagaland was not aware that HIV can be prevented.

There are several limitations to this study. Firstly, we used RDS to recruit IDUs in the study as random sampling was not feasible. Although the RDS can not provide random samples of target population, it can be considered the best one could expect from a target population where random sampling is not possible<sup>25</sup>. The statistical theory upon which RDS is based suggests that if peer recruitment proceeds through a sufficiently large number of waves, the composition of the sample will stabilize, becoming independent of the seeds from which recruitment began and thereby overcoming any bias the non random choice of seeds may have introduced<sup>25,26</sup>. This stable sample composition is termed

as “equilibrium”<sup>26</sup>. After achieving equilibrium the sample becomes representative of study population<sup>27</sup>. In this study, equilibriums with regards to the most of the key characteristics were achieved after 4-6 waves. Secondly, due to the cross-sectional nature of the study, causality could not be established. Thirdly, the results of the study were based on self-reported data, which could be potentially subject to reporting errors. Besides, a single question asked to ascertain knowledge about HIV prevention may not be sufficient to measure broad domains of knowledge about HIV/AIDS. But, consistent with the results of this report another study also showed that high proportion of IDUs in Manipur had knowledge about HIV prevention supporting the veracity of our results<sup>28</sup>. The findings of this study could not be generalized to female IDUs as the study was restricted to male IDUs only. Further study is required to understand the HIV testing behaviour among female IDUs in the region which comprises about 5-10 per cent of IDU population in the region<sup>29</sup>.

Despite these limitations, the findings of this study will help in developing strategies to promote uptake of HIV testing and reducing undiagnosed HIV infections among IDUs in this high HIV prevalence setting in India. HIV testing is the fundamental component of HIV prevention, treatment and care. Therefore, it is a great concern that only about one fifth of IDUs in this study had ever tested for HIV, which underscores the urgency to scale up HIV testing programme among IDUs in this region. Several factors have been identified that influence uptake of HIV testing among this IDU population. Taking into account these findings, innovative strategies should be developed to address low uptake of HIV testing among the IDUs in this region.

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